Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

had contributed a similar amount. Private individuals had also subscribed something, but still without the assistance of the Public, this would be insufficient. It was intended to send to every Fellow of the Society a circular containing a statement of the difficulties which Captains Speke and Grant would probably have to encounter, and what was proposed to be done to provide for the safety of these adventurous men.

The Paper read was—

On the Physical Geography of the Sea, in Connection with the Antarctic Regions.

By Captain M. F. Maury, U.S. Navy; Corresp. F.R.G.S., *etc.*

The President next said they were aware that the principal subject of the evening was a paper to be read by a geographer who had done them the honour of coming among them from the United States; a gentleman of world-wide reputation, who by the energy of his character and the power of his arguments had induced civilised nations to concur with him in adopting one great plan for ascertaining the meteorology of the ocean. He had collected the records and observations which had as yet been made upon the subject, and, with the assistance of the maritime nations of the world, was in course of receiving further information.

Captain Maury, U.S., after detailing the statistical results of his labours for several years in this previously unexamined field of inquiry, proceeded to dwell specially upon the effects of the winds and currents in the southern hemisphere. He pointed out that, by a knowledge of the set of the winds, sailing vessels had been able to make greater average runs than any steamers had yet been able to accomplish, and this solely by attention to the force of the winds in certain southern latitudes. Before the course of the Gulf-stream was known, ships from Europe to New York in winter used to sail, first to Charleston, South Carolina, then coast it down to the Hudson. The voyage used to occupy them from six to eight months. The Nantucket fishermen were the first to discover the course of the Gulf-stream, and while English captains were taking six months to reach New York, they used to make the run sometimes in one month. Vessels running north of this stream in winter get their sails and rigging frozen, so that it is scarcely possible to make any headway. By running into the stream they thaw it, for the water is always warm, and is known by this and its intense dark-blue colour. It is provided as a reservoir of heat by the Great Governor of Worlds to accomplish his grand purposes. It is the influence of this stream which renders the climate of Britain so genial. Were it diverted to break upon the coasts of Spain only, the island of Britain would soon become a bleak, cold, and inhospitable region, with a climate as cold and a winter as long as Labrador; and Erin would cease to be named the Emerald Isle, for her fields would be covered with snow during eight months in the year instead of green herbage. Captain Maury, in his observations to the meeting, dwelt also very prominently upon the characteristic difference in temperature, &c., between the Arctic and Antarctic regions. The mean average height of the barometer in low southern latitudes was about 28° 2′, and was never so high as 31°, whilst Captain M'Clintock had found it above that in 77° north latitude. The range of the barometer was invariably 1° lower at the least in corresponding latitudes in the northern and southern Polar regions. This was attributable, in one respect, to the preponderance of land and ice in the northern circle, and the greater quantity of sea in the south. Hence, as was noted in Keith Johnston's 'Atlas of Physical Geography,' the rain-gauge indicated a fall in Patagonia of 153 inches of rain in 41 days. In South Shetland, in 63° south latitude, a minimum thermometer, which had been left on shore there by some whalers for a long period, never registered a lower degree of cold than −5; whereas in 32° latitude in the United States they had a greater degree of cold than this. Another point on which he dwelt with some emphasis was the greater amount of force of the south-eastern trade-winds over the north-eastern, which might be characterised as 13 and 11 lbs. respectively of force to the square foot. He had calculated from the logs the speed of at least 2200 vessels from the Cape of Good Hope to United States ports, and had also had the experimental results of Admiral Chabannes to corroborate his views; and while vessels with the south-east trade-winds abaft made an average of 8¾ knots per hour, those going with the north-east trades made scarcely half that speed. After adverting to many other purely practical matters, Captain Maury concluded by urging upon the attention of the Royal Geographical Society the importance of extending the field of research in the Southern Polar regions, of which so little was yet known, while that of the Arctic regions was now pretty thoroughly explored and mapped. It might be asked what good would result from prosecuting this field of research? And perhaps it would be difficult to answer this question properly, so as to satisfy all. That there was, however, an untold mine of wealth there, even in a commercial point of view, he fully believed. The value of the fur seal fishery was something fabulous. He had conversed with an American whaler who had been concerned in the capture of more than 300,000 fur seals, and the value of their skins in one season was about 40 dollars each. But there was, moreover, a great deal of unexplored land there, which it was highly desirable to see defined; and as the climate was so much milder than the northern latitude, who could tell what openings for commerce might arise there? Here was a field for exploration lying within eight or ten days' steaming of an important British possession (Victoria), and which was yet as little known as the interior of the moon. He trusted the Royal Geographical Society would do something towards removing this stigma on British enterprise. For the last twenty years France, England, Russia, and the United States had done nothing in the way of exploration in this quarter. Sir James Ross had penetrated farther south than any other navigator, but it was still no very arduous matter for some explorer to seek out a winter harbour, and ascertain whether there was not a secure anchorage for one or two vessels, from whence exploring parties might prosecute their researches by land and sea, by boats or over the ice, and tell the world what they had seen, and whether there were any mineral or other industrial resources available in that quarter. The prosecution of this enterprise lay at their own doors. If they made not haste to undertake the duty, it might be that the go-ahead American nation would be yet before them. If the British nation neglected this duty, it would be a reproach to them in after ages that they had neglected so fair an opportunity of adding to their maritime laurels, and to the high reputation they had already attained for ocean discovery and research in high latitudes.

ADMIRAL FITZROY, F.R.G.S., said it was impossible to estimate how immense was the debt which all countries owed to Captain Maury for the system of collecting and classifying observations which he had suggested, and which had been productive of such useful and practical results. Captain Maury came over to this country many years ago and asked for assistance in collecting the information and experience of navigators, but at that time his views were not considered of sufficient importance to induce the active exertions of this country in the cause which he had at heart. Hitherto the experience of the seaman had, as it were, been only available to himself; but by the method of collecting information adopted by Maury, the experience of the whole maritime world was made available for future generations. He should like to mention one fact with reference to the means by which Captain Maury had already effected so much. Through the United States Government he had been enabled during the last five years to disperse among our own countrymen, in our ships, on our waters, and for our special benefit, no less than 700 large quarto volumes of Sailing Directions, which had been eagerly asked for by every captain of a ship that had to make a foreign voyage. In addition to this, more than 12,000 large sheets or charts, each worth not less than 3s., had been distributed gratis, and not only distributed gratis, but sent to the persons who were willing to make use of them, and to collect similar observations for future use. For fifteen years had Maury been at work for the benefit of his fellow men; and if within the next few years, assisted by fellow-labourers in various parts of the world, similar operations were carried on as zealously, there could be no doubt that the most distant regions which could be reached by sea, their various peculiarities and atmospheric phenomena, would become as familiarly known as the Atlantic and the Bay of Biscay.

CAPTAIN JANSEN, of Holland, said, the practical result in his country had been to shorten the passage of ships to Java by a mean average of ten days, and to Australia by eight, ten, and fourteen days. He had himself made the passage from England to Australia, following Captain Maury's sailing directions, in fifty-nine days, while another captain, who boasted that by making the passage along latitude 38° he would beat Captain Maury's route by at least ten days, was seventy days on the voyage, and upon arriving at Australia was astonished to find that he (Captain Jansen) had been so long in port.

Captain J. Washington, Hydrographer R.N., F.R.G.S., said he could not resist stretching out the right hand of fellowship across the Atlantic to the gallant Captain Maury, who had so nobly aided us in the cause of navigation. If our ships and our whalers made good voyages, it was to him that we were indebted; and he cordially agreed with him that no part of the world should be left unsearched that could in any way throw light on the subject of meteorology, and thus enable us to make voyages still more rapidly. Captain Maury, however, concluded his address by saying that it rested with England to explore the Antarctic regions. Now, ought we to accept so great a charge without a little inquiry? England had done her part in promoting voyages of discovery. Cook in 1770 and Ross in the present century, both celebrated circumnavigators, had visited these regions; and the South Shetland Islands were discovered by James Biscoe, in the employ of Mr. Enderby of London. Two celebrated Russians and two celebrated Frenchmen had also explored the Antarctic regions. With these facts before him, he would ask whether it might not rest with the United States to take up the question and to send out an expedition? They would meet, no doubt, with every assistance at Melbourne, or, if that place did not suit them, there were the islands of New Amsterdam in the Southern Ocean, frequented exclusively by American whalers, from which an expedition might be advantageously despatched. England and France had as yet done more to explore these regions than the United States, and, believing that there was at present little probability of our sending out an expedition, he ventured to suggest to Captain Maury that his countrymen should do it, and he could assure him that they would have our best wishes and cordial co-operation.

Captain Sir F. L. M'Clintock, R.N., F.R.G.S., said as he had just returned from the Arctic regions he might be permitted to say a few words upon the formation of icebergs in support of the theory as to the existence of a large continent at the South Pole. So far as he had been able to see, it was necessary that there should be high land upon which glaciers were formed in the first instance. They were formed by deposits of water and snow, and were forced out by the pressure of the accumulated mass behind, until they were finally launched into the sea. And it was also necessary that there should be a vast quantity of moisture in the atmosphere to cause the rain and snow from which the glaciers were formed. On the shores of South Greenland there was a vast deal of moisture, and on the land a vast deal of glacier stretching continuously from the shore to a short distance inland; but advancing farther into the straits, and leaving the region of moisture behind, the region of the glacier was left behind. The two conditions which Captain Maury mentioned as necessary for the formation of glaciers existed in the north, and where those conditions did not exist, there there was no glacier. With high land and abundance of moisture there was abundance of icebergs, while farther north, in the Archipelago of Barrow Straits, with a drier atmosphere, icebergs were not seen.

Captain Sir Edward Belcher, R.N., F.R.G.S., also spoke of the formation of icebergs in the Arctic regions. From the beginning of September snow fell upon the mountains of Greenland to the southward, and continued to fall till November or December, when the cold became so intense that no more snow could be formed. In the following summer the sun thawed these accumulations of snow, which flowed from the face of the cliff and formed layer after layer of ice, until at last the attachment of the ice to the parent stock of the mountain was so weak that it fell off into the sea and became an iceberg. Nothing was known of a salt iceberg, and there could be no formation in the sea of an iceberg. All icebergs were pure fresh-water formations. With respect to vapours on the Labrador coast, they would be due to the warm water of the Gulf-stream, which the cold air above would condense and cause to evaporate in the shape of fog, as we knew it did on the banks of Newfoundland. An equatorial current, similar to the Gulf-stream, passed down the coast of South America round Cape Horn, and no doubt caused the vapours which Captain Maury had referred to there. With the intense cold and the want of summer which we found at the Antarctic regions, it was impossible, he thought, for ships to find safe anchorage there, so as to be able to pursue the inquiry which Captain Maury wished to effect. If he were to go, and were to find a suitable harbour, he would let his vessel be frozen in and make the necessary observations during the winter, but he would take good care that some one should come next year to look for him.

Dr. John Rae, f.r.g.s., fully concurred with what had been said respecting icebergs. But he had witnessed another mode in which icebergs were formed, and that was by drift-banks over a precipice. When the wind prevailed to the north-west on lands having a south-west exposure, these banks were drifted up in the winter by a succession of snow-drifts. They sloped out to the sea, and he had seen them, in one storm, drift to the height of thirty or forty feet. As soon as the thaw came, the snow thawed at the top, and the water, percolating through the snow, got down to a temperature below freezing point, and froze the whole mass into solid ice. In this way there would be at times as much as thirty or forty feet of solid ice left over to the next season, when a second drift would take place. Thus, in time, a bank of solid ice would be formed, projecting out into the sea, and by the action of water and changes of temperature it broke off and formed an iceberg. He had also enjoyed the opportunity of witnessing the ice-flakes in Greenland, the appearance of which he described.

Captain Maury, in reply to Captain Washington's remarks, said the United States also claimed Captain Cook as belonging to them, inasmuch as the Americans were British subjects in the time of Captain Cook. As for what the British Government had done for navigation, the office over which Captain Washington presided was the great centre of the hydrographical information of the world. All that he meant in his remarks was, to give fair warning that if England did not undertake these explorations, the Americans would show the way. He was happy to hear that his remarks about icebergs were confirmed by gentlemen who had had much more experience upon the subject than himself. With regard to the currents to which Sir Edward Belcher had alluded, he had always observed that, where the water was warmer than was due to the latitude, it came from the equatorial regions, and where it was cooler it came from the polar regions.

The President, in closing the discussion, expressed a hope that Government would undertake the proposed exploration of the Antarctic seas, which, he added, was as much for the general benefit of mankind as it was for the glory of this country.